CLAIMS

What is claimed is:

1. A notch compensator comprising:

means for receiving input to a notch filter;

means for receiving output from the notch filter;

means for dynamically calculating a desired change to a notch frequency of the notch filter; and

means for specifying the desired change to the notch filter.

2. The notch compensator of claim 1 wherein said input receiving means comprises a first pre-filter providing a notch output error as output.

3. The notch compensator of claim 2 wherein said output receiving means comprises said first pre-filter.

4. The notch compensator of claim 2 wherein said input receiving means comprises a second pre-filter providing a reference signal as output.

5. The notch compensator of claim 4 wherein said calculating means comprises demodulation means receiving input from said first and second pre-filters.

6. The notch compensator of claim 5 wherein said demodulation means provides a frequency error as output.

7. The notch compensator of claim 6 wherein said calculating means additionally comprises integral compensation means receiving the frequency error as input.

8. The notch compensator of claim 7 wherein said integral compensation means minimizes the notch output error.

9. The notch compensator of claim 5 wherein said demodulation means comprises a low pass filter that is second order with a bandwidth about one decade below an expected value of a next notch frequency.

10. A notch compensation method comprising the steps of:

receiving input to a notch filter;

receiving output from the notch filter;

dynamically calculating a desired change to a notch frequency of the notch filter; and

specifying the desired change to the notch filter.

11. The notch compensation method of claim 10 wherein receiving input comprises employing a first pre-filter that provides a notch output error as output.

12. The notch compensation method of claim 11 wherein receiving output comprises employing the first pre-filter.

13. The notch compensation method of claim 11 wherein receiving input comprises employing a second pre-filter that provides a reference signal as output.

14. The notch compensation method of claim 13 wherein calculating comprises demodulating employing input from the first and second pre-filters.

15. The notch compensation method of claim 14 wherein the demodulating step provides a frequency error as output.

16. The notch compensation method of claim 15 wherein the calculating step additionally comprises performing integral compensation employing the frequency error as input.

17. The notch compensation method of claim 16 wherein performing integral compensation minimizes the notch output error.

18. The notch compensation method of claim 14 wherein the demodulating step comprises employing a low pass filter that is second order with a bandwidth about one decade below an expected value of a next notch frequency.

19. A notch filtering system comprising a notch filter and a notch compensator according to claim 1.

20. The notch filtering system of claim 19 wherein said system is employed in an application selected from the group consisting of reducing structural resonances in control of mechanical structures, reducing noise harmonics of time varying and/or uncertain frequency, adaptive harmonic noise identification, adaptive harmonic noise filtering, and control of flexible structures.

21. The notch filtering system of claims 19 wherein said system is employed in an application selected from the group consisting of control of gimbaled turrets, control of helicopters, stabilization platforms, gyroscopic rate sensors, computer hard drives, vehicle body bending compensation, and flexible robotic manipulators.